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B8H HPB

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GB 0945938 A GB 0268696 A US 4896749 A
US 4193469 A US 4095378 A US 3892287 A

(58) Field of Search
UK CL (Edition N) B7B BPF , B7D DXA , B7H HMJ HQX , B8H HKF
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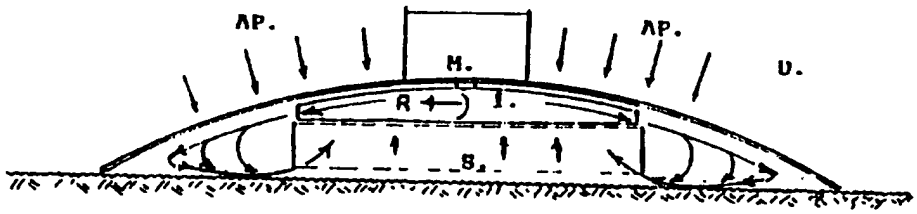
Online: WPI

(54) Device, eg for vehicles or for lifting sheet material, for increasing adhesion to a surface by suction force

(57) The device comprises a circular dome D with an impeller I at its centre which is driven by a motor M. The impeller I forces air radially outwards towards the rim of the dome so that air is drawn upwards to replace it. When placed close to, or in contact with, a surface SF a region of low pressure is set up which forces the device towards the surface. The device may be fitted to the underside of a wheeled vehicle (fig. 5) to increase the contact pressure of the vehicle with the ground, the dome D having a flexible rubber or bristle rim to accommodate uneven surfaces. The device may be used to hold a wheeled or tracked vehicle onto a vertical surface to allow it to move about under its own traction. The device may be used to lift non-magnetic sheet materials, eg timber boards.

Fig. 2.



AP = Atmospheric Pressure.

Fig.5.

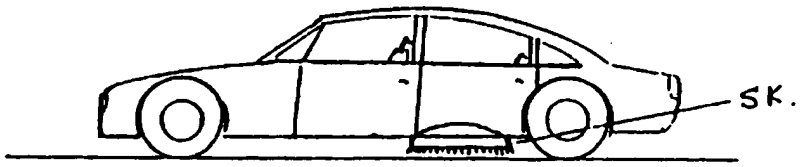


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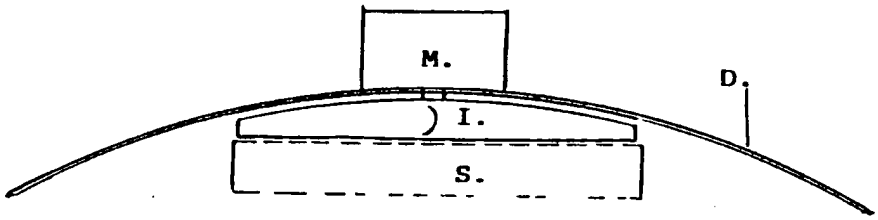
Fig.1.



Above: Section through the BARPRESS structure.

Below: View of the underside.

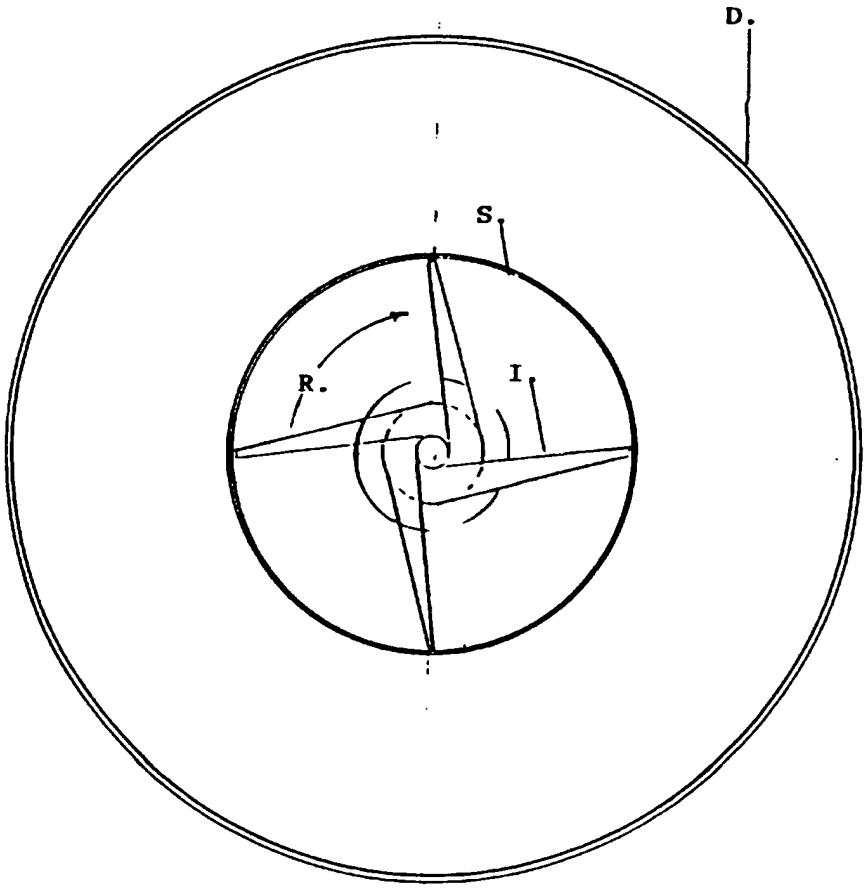
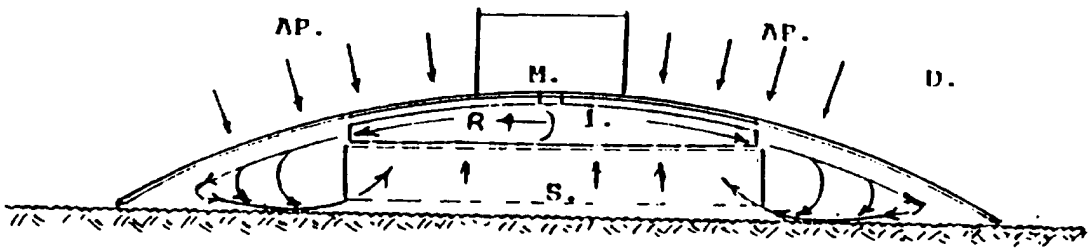


Fig. 2.



SF.

AP = Atmospheric Pressure.

Fig. 3 .

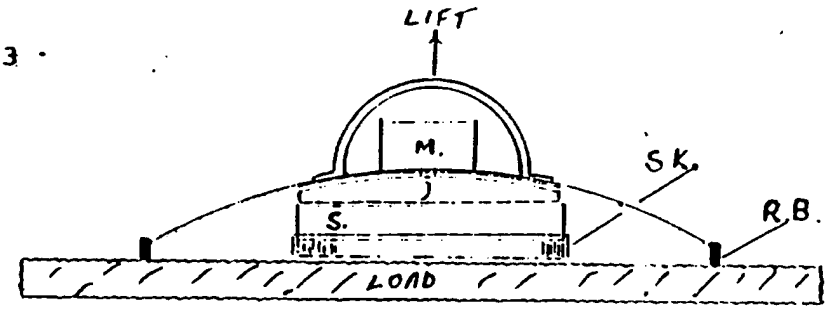
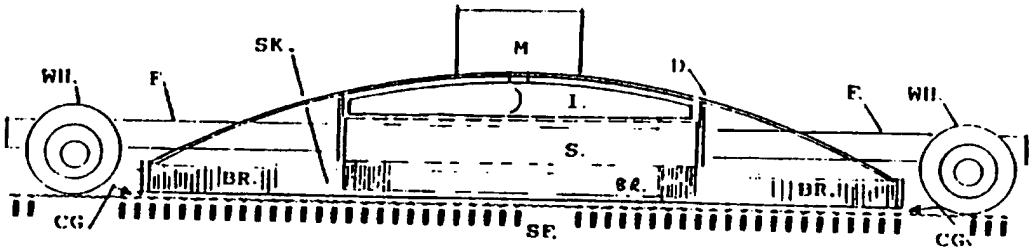


Fig. 4.



Section through the BARPRESS structure.

Fig.5.

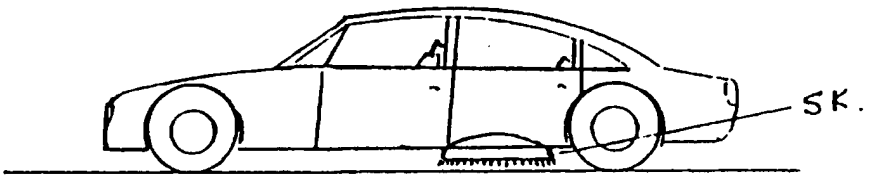
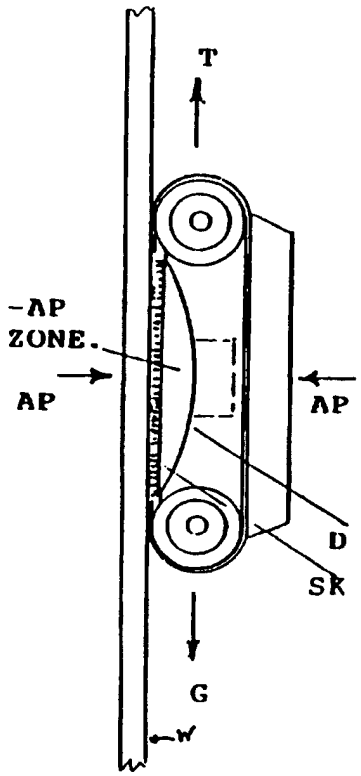


Fig. 6.



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THE BARPRESS.

The Atmosphere normally exerts a pressure which is(approximate) equal to 1 Kg per square centimetre, or 10,000 Kg. per square metre of surface in all directions.

THE BARPRESS is a device which is designed to utilize a fraction of this ever present pressure in any desireable direction to perform a service.

It consists of a shallow dome or dish (ref: Fig.1) at the centre of which is mounted a motor 'M.' with its drive shaft passing through the shell of the dome to the inside which has a multi-blade rotorary impellor 'I' mounted upon it. which drive it in the direction 'R' at a very high speed.

When in motion, the blades rapidly sweep an annular space immediately beneath the inner surface of the dome 'D.' driving the air molecules within it tangentally outwards along the inner surface of the dome.

Replacement air is then drawn into the centre region through the guide shield 'S' and the movement of air continues.

When the end of the dome is open to the atmosphere, a continuous flow of considerable volume takes place as would be the case with any centrifrugal fan and little effect would take place other than that.

If however, the open end of the dome is brought into close proximity with a solid, non porous surface 'SF' (ref: fig.2.), air from the outside atmosphere has a very much restricted entry and a cyclic circulation of air is set up within the dome and the surface it is in close proximity to.

This rapid cyclic movement of air which is guided by the shield 'S'. creates a reducing pressure difference between the inner surface of the dome and the atmosphere outside it.

A differential pressure is then set up, forcing the dome into pressure contact with the surface it is in proximity with, which increases as the energy input and the rate of revolution is increased. The arrows within the dome indicate the direction of airflow inside the dome, and the arrows outside, the differential pressure.

When the surface in close proximity is horizontal, (such as a road surface,) the BARPRESS will act in the same direction as gravity; on a vertical wall, it will be forced towards it, and on a ceiling it would counter the effect of gravity.

THE BARPRESS may also be firmly supported above the surface 'SF.' (In experiment, the BARPRESS dome was mounted on a steel frame on wheels.) Ie.in close proximity to surface 'SF.' but without any direct physical contact with it, and, due to the restriction of entry for atmospheric air molecules that the presence of the surface 'SF.' provides, the Barpress will still create a cyclic circulatory situation within the dome 'D.' when it comes into operation and a substantial proximity pressure effect will be generated. The magnitude of this pressure will depend upon the size of the dome 'D,' the diameter of the impellor, the number of blades it carries and the speed of revolution. (ie. the amount of energy fed into the rotor.)

The development of this effect is assisted by the air molecules travelling at high velocity along the inside of the dome arriving at the rim with sufficient energy to resist the entry of of air from outside the dome.(ref: Fig,4.)

The pressure difference exerted on the dome of the Barpress will be transmitted to the Chassis of the vehicle supporting it and so will increase the contact pressure of the wheels on the surface 'SF.' thus it is possible to create a region of negative pressure in a zone on the underside of a vehicle which will result in a positive increase on its surface,which will allow the wheeled vehicle to freely be moved about in contact with a solid non-porous surface in any plane of elevation, or complete inversion, provided that the pressure generated by the Barpress is sufficient to more than equal the gravitational attraction due to the vehicles' mass, and in the case of a vehicle required to travel up a very steep or vertical incline, the pressure required must be in excess of the track or tyre contact pressure required to produce the frictional grip to support the weight of the vehicle, and the tractive drive must be powerful enough to lift the body weight of the vehicle upwards.

A MOBILE BARPRESS

The diagram below represents the form of an experimental model, where the dome '**D**,' is fitted into a steel frame '**F**' which is supported by small wheels '**WH**.' (ref. Fig 3).

In this, the dome is lifted up to give a larger ground clearance and a 'SKIRT' '**SK**.' of closely packed BRISTLES '**BR**.' is fitted to the rim so that it clears the surface by leaving a gap '**CG**.' This forms an effective barrier round the base to contain the internal circulation within the dome and at the same time is flexible enough to yield temporarily to any small irregularities in the surface which it is traversing.

It follows that the priciples of the Barpress could be applied in various sizes with correspondingly different energy levels, to a number of widely different applications, which only further research could fully evaluate.

Example 1. A Barpress could be fitted to the underside of a high performance car, where it could be brought into use when required, to improve road holding characteristics, lateral stability, (Note: Depending upon the speed and mass of the rotating mechanism, the Barpress could well contribute a significant Gyroscopic Effect.) and additional accelerating and braking capabilities. It could be interlinked with the controls of the car to absorb energy in the process of braking.

The Skirt SK. could be constructed from rubber with a bristle rim BR. and made retractable, though such cars often have adustable suspension. (ref. Fig 5.)

Example 2. A barpress fitted with a rubber seal at its outer rim RB. could be used for lifting and handling sheet materials such as timber products, glass and non ferrous metals. (ref. Fig 3).

M = Motor. SK = skirt of bristle. RB = rubber seal.

THE VERTIVEHICLE

Consisting of a high powered Barpress driven by a lightweight, high speed engine fitted to the underside of a lightweight vehicle, constructed from aircraft materials equipped with caterpillar tracks which are fitted with soft contact grips, a very low gear ratio, supplying sufficient torque to more than exceed the traction effort required to lift its own weight vertically upwards, could be capable of climbing up and crawling about on a vertical surface. (Ref. Fig 6). Inspection and maintainance could be carried out by remote control in a number of places where easy access is not possible, or it is more economical to do it another way.

Ref. to the diagram on this page: G = Gravity T = Traction. AP = Air Pressure.
-AP - Low air pressure. W = Wall.
FR - Friction component

If the air pressure differential produced by the Barpress, produces sufficient friction at the area of track in contact with the wall or surface, to resist the gravitational pull on the vehicle, it will remain stationary on the wall. (note: A vehicle such as this would need to be driven by a worm gear reduction which is only reversible when driven in reverse and remains locked when stationary.)

The vehicle will climb the wall when the tractive force T. exceeds the value of the gravitational pull G.

(In the experimental model used to prove this possibility, the weight of the model was 2.4 Kg. while the pressure produced by the Barpress under it was about 2,5Kg. It was energised by electricity fed from a flexible cable.)

CLAIMS.

1. A PRESSURE GENERATING DEVICE, CONSISTING OF A ROUND SHALLOW DISH, with an externally driven rotor at its centre, which can be used independently, or secured beneath a wheeled road vehicle in close proximity to the road surface(but not in direct contact with) the surface which the wheels are resting on.

2. A means of increasing the wheel to surface contact pressure, when the rotor referred to in claim 1,has reached the required rotational speed, by adding to the contact pressure due to the weight of the vehicle, the pressure generated by the Barpress.(ref.Fig4).

3. A method or means of applying sufficient pressure to a vehicle, to provide sufficient friction for traction to a surface, where gravitational force does not act in favour, such as; the path up a vertical wall (as ref.in ex. 3.) or across an inverted surface in direct opposition to the influence.of gravity.

4. A means of attachment to smooth or roughly surfaced sheet materials for the purpose of anchoring,lifting or handling. (ref. Fig.3))

The Patent Office

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Claims searched: 1 to 4

Examiner: John Twin
Date of search: 20 December 1995

Patents Act 1977
Search Report under Section 17

Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

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Other: Online: WPI

Documents considered to be relevant:

Category	Identity of document and relevant passage		Relevant to claims
X	GB945938	(Hurst)	1,2
X	GB268696	(Nicin)	1,2
X	US4896749	(Walker)	4
X	US4193469	(Graf)	1,2
X	US4095378	(Urakami)	3
X	US3892287	(Bennett)	4

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.